

■ Forming Electrolytic DC Capacitors

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The structure of an electrolytic capacitor

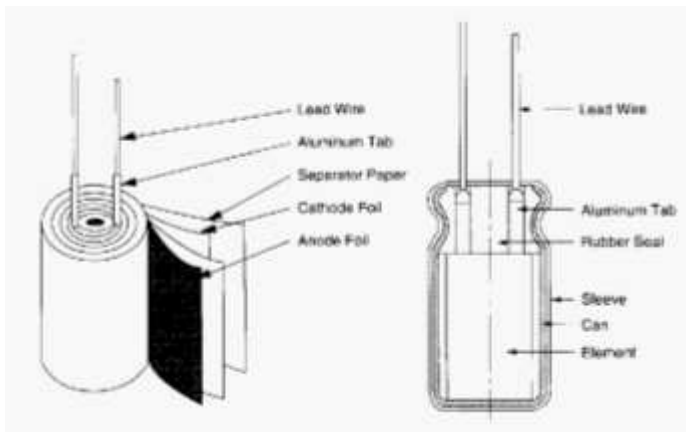


Fig. 1: Structure of an electrolytic capacitor

Aluminum electrolytic capacitors are used for energy storage in the DC-circuit in PMC-2 and MC-4 MotorControllers. Internally, they consist of two aluminum foils separated by paper. The paper is impregnated with an electrolyte

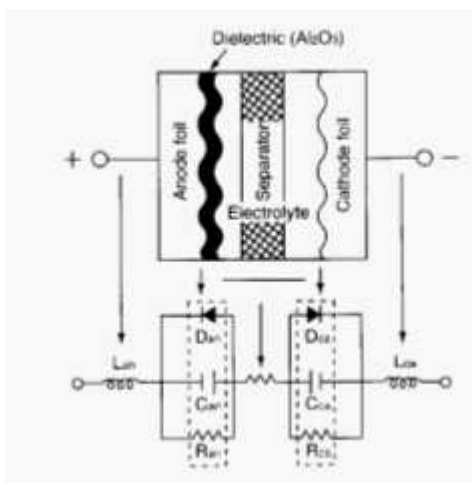


Fig. 2: Oxide layer as dielectric

A voltage applied in the production process results in the formation of a very thin oxide layer on the anode foil. This layer acts as a dielectric. This process is called “forming“.

What happens when electrolytic capacitors are stored with no voltage?

When such electrolytic capacitors are stored without voltage, the oxide layer gradually decomposes (aging), as the electrolyte “dissolves” this layer. When a voltage is applied again, the layer reforms. During this process, there is a higher leakage current, which causes the electrolytic capacitor to warm up. In worst-case conditions, the electrolytic capacitor may be destroyed if voltage is applied without a current-restricting resistor for protection.

What does this mean for the PMC-2 and the MC-4?

For safety reasons, it is required e.g. for the MC-4 (operating manual, chapter 5.1 Forming) that devices that were stored without voltage for more than one year be “formed” (or rather “reformed”) before applying the mains voltage. This only applies to older generations of electrolytic capacitors.

This no longer matters for the electrolytic DC capacitors that were and are still used in the PMC-2 and the MC-4. According to the manufacturer, the electric values (particularly leakage current) remain within the specified limits even after the electrolytic capacitor is stored for 5 years in normal temperatures. After this time, the mains voltage can be applied to the devices with no problem at all.

Therefore the chapter “Forming“ in the operating manual will be entirely deleted!

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